Test of the Mathematical Simulation Codes for CMS HF Source Calibration Basing on the Quartz/Brass Calorimeter Experimental Data

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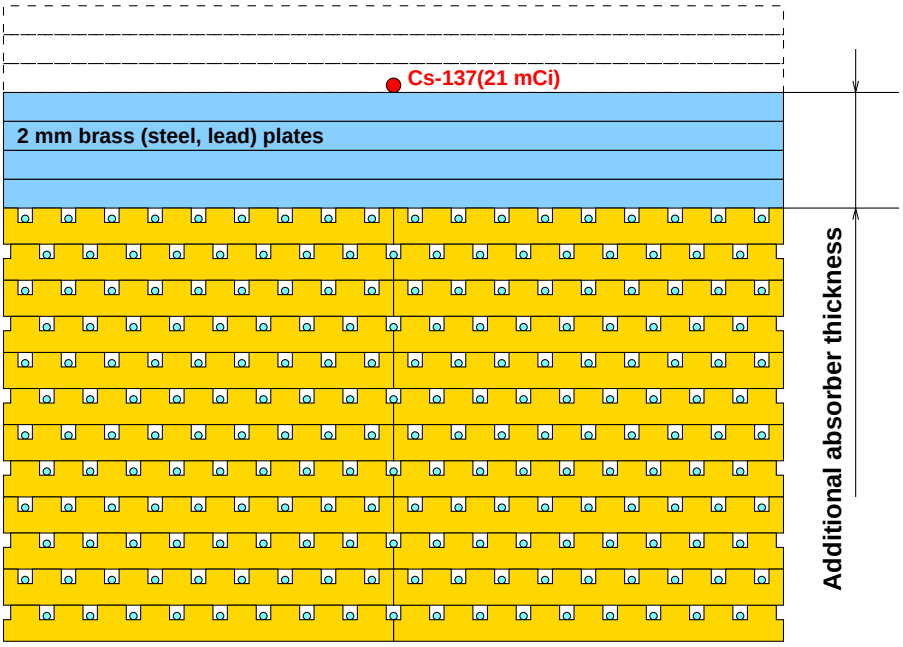
CERN, June 2002

The software codes for mathematical simulation of the CMS HF calibration using radioactive source were tested by the comparison with the data of source measurements at the quartz/brass calorimeter.

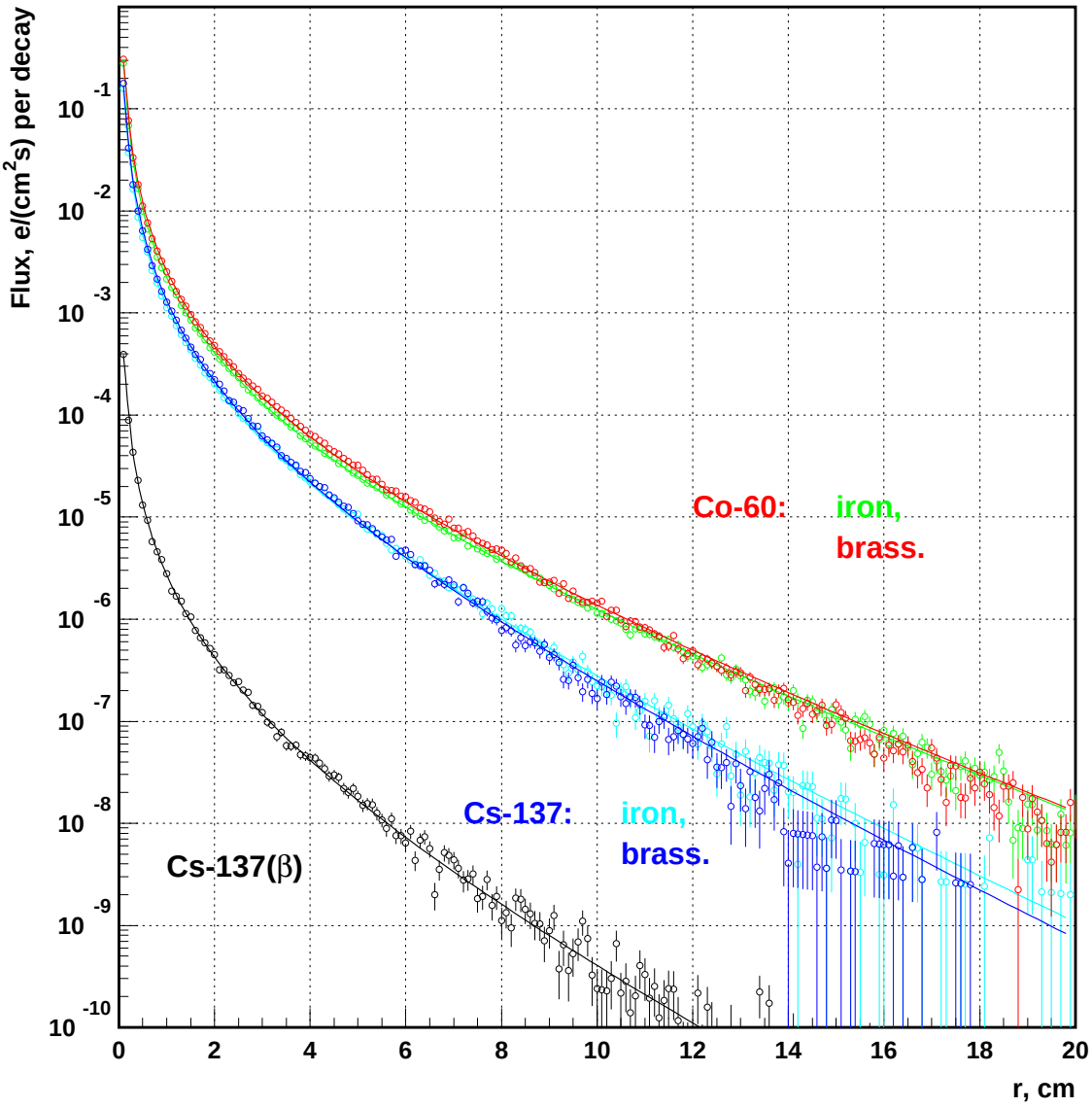
Calorimeter construction is very close to the one of the CMS HF. The calorimeter response to the cesium source was measured for the different matters of the additional absorber (lead, steel or brass) positioned between the source and the calorimeter.
Additional absorber thicknesses were 2-4 cm.
Cesium source activity was 21 mCi.

The same software codes as for CMS HF simulation were used to reproduce the calorimeter response. Insignificant corrections concerned more precise description of the γ and β fluxes reduction on the short ranges. The examples of the result fluxes of Compton-electrons are presented too.

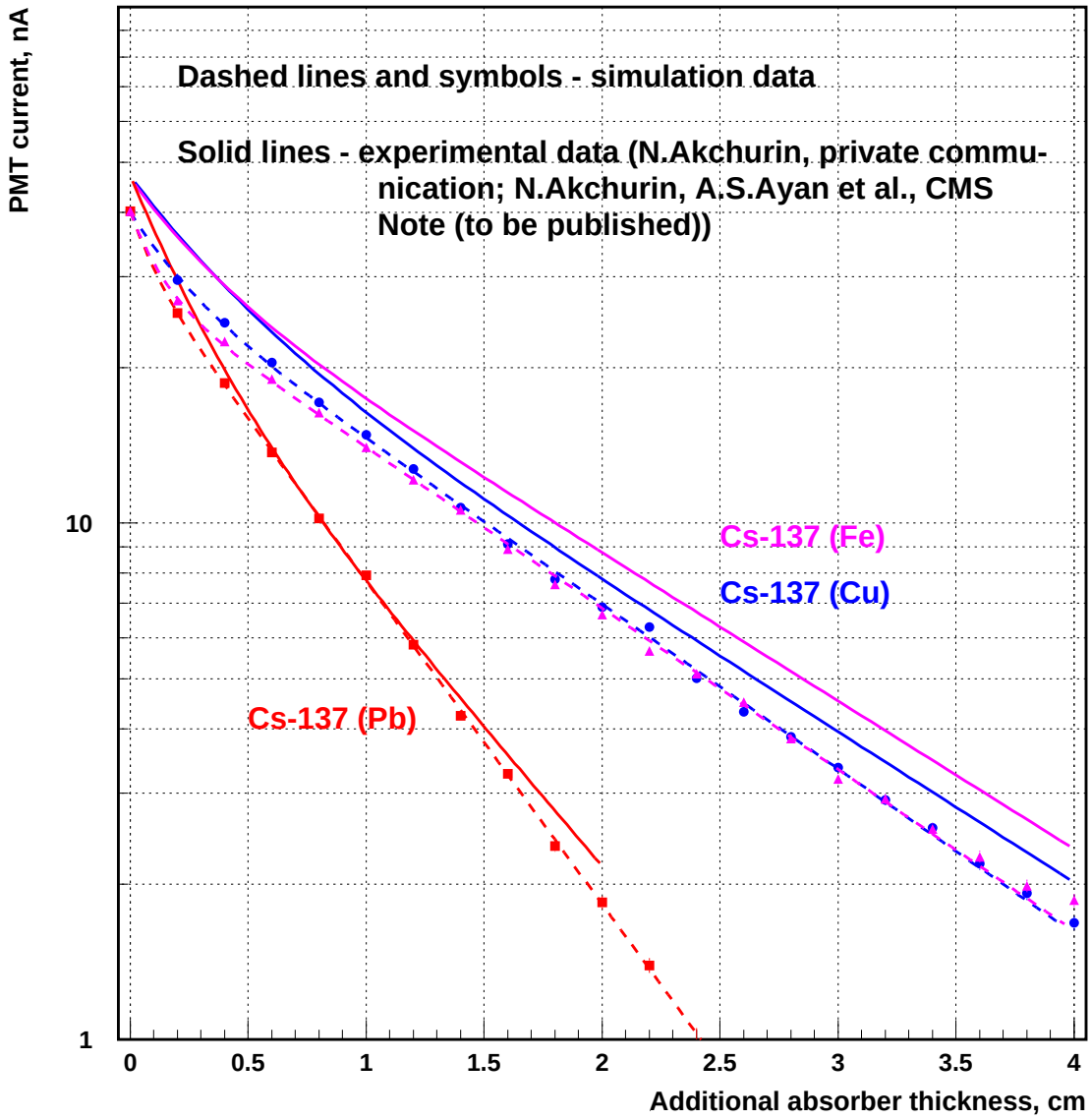
Simulated experimental setup.



Compton-electron flux (E > 174 KeV)



Measured and simulated signals in the quartz/brass calorimeter



CONCLUSION

Better than 0.15 of signal value agreement with the experiment permits us to believe our mathematical simulation estimations for CMS HF calibration with the radioactive source.